UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)
Office Action Summary	10/629,415	BURKEY, TODD R.
	Examiner	Art Unit
	Daniel Kim	2185

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>14 June 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-16</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-3,6-9,11,12,14 and 15</u> is/are rejected.

7)☒ Claim(s) <u>4,5,10,13 and 16</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>29 July 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Status

1.   This Office Action is in response to applicant's communication filed June 14,
2007 in response to the PTO Office Action mailed February 15, 2007. The applicant's
remarks and amendments to the claims and/or the specification were considered with
the results that follow.

2.   In response to the last Office Action, claims 1-2, 6, 8, 11 and 14 have been
amended, and no claims have been canceled or added. Claims 1-16 remain pending in
this application.

Response to Arguments

3.   Applicant's arguments filed June 14, 2007 with respect to claims 1-16 have been
fully considered but they are not persuasive.

Applicant has presented the argument that Kim et al (US PGPub 20030023811)
fails to disclose dynamically resizing mirrored virtual disks, stating that what is described
is the managing of a logical volume, but not necessarily mirrored virtual disks. Examiner
disagrees.

Kim discloses a logical volume manager which provides a logical volume which is
one virtual disk drive and includes multiple physical disk drives and implements RAID
technique with software to construct the logical volume (par. 0002), where it is well

known in the art that a RAID-1 technique involves disk mirroring and includes at least

two drives that duplicate the storage of data (par. 0011), which can be used in

combination with other RAID techniques such that there is a combination of striping and

mirroring, etc. (par. 0024). Therefore, it would have been obvious to one of ordinary skill

in the art at the time of the invention that a logical volume manager for managing logical

volumes implementing RAID techniques, and the resizing of such volumes, would

provide for mirroring and resizing of mirrored virtual disks. There are further mentioned

examples of mirrored disk partitions (par. 0087).

Applicant has further presented the argument that Kim fails to disclose

manipulating RAIDs in the storage system prior to resizing mirrored virtual disks. Kim

discloses logical volumes that can be resized while the system is operating (par. 0079),

where information on a volume includes a size of the extent and RAID level (par. 0082).

One embodiment discloses a volume may be resized where its RAID configuration and

a new disk partition are added to the volume in order to increase capacity, therefore the

logical volume contains one more partition than the original logical volume (par. 0137). It

is apparent that the RAID configuration is manipulated in some way, in this case, a

RAID level is expanded to a disk partition before the partition is added to a logical

volume (par. 0137, 0139).

Therefore, examiner respectfully maintains that Kim discloses the applicant's

invention to the extent to which it is claimed. However, a new grounds of rejection is

provided to address new 35 U.S.C. 101 issues as detailed below.

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5.   Claim 7 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter because the claims are not limited to physical (i.e., material or tangible) embodiments of a computer program product.

In view of applicant's disclosure, the "program storage device" as per claim 7 is described as a "carrier... or data communications devices" at pages 14-15. Since such said media may be interpreted to include an embodiment in which such programs are carried on a carrier wave, this does not limit the invention to only tangible embodiments, instead being defined as including both physical embodiments (floppy disks, CD-ROMs, magneto-optical disks, semiconductor memories, and hard disk drives, etc.) and non-physical embodiments (digital signals distributed over a network, carrier waves, etc.).

Applicant's disclosure of what constitutes the scope of a "program storage device" includes non-physical, intangible embodiments because digital signals such as radio frequency or light wave transmission through wired or wireless communications links do not classify as useful, physical, tangible media, and therefore are not limited to statutory subject matter. This language must be corrected accordingly.

Further where the "program storage device" is interpreted as software per se, that is, only code or software by itself, this embodiment is not limited to statutory subject matter for failing to provide a utility or practical application. Software per se provides no

useful process or application, and therefore the claim is not limited to statutory subject

matter.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite

for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention.

For claim 1, the language "manipulating RAIDs in the RAID storage system to

assigned to the mirrored virtual disks" is ambiguous and renders the scope of the claim

indefinite. For the purposes of this action, examiner will assume the language as

"manipulating RAIDs in the RAID storage system to be assigned to the mirrored virtual

disks".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by
> another filed in the United States before the invention by the applicant for patent or (2) a patent
> granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9.   Claims 1-3, 6, 8 and 11-12 and 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al (US PGPub No. 20030023811).

For claim 1, Kim discloses a program storage device readable by a computer tangibly embodying one or more programs of instructions executable by the computer to perform a method for dynamically resizing mirrored virtual disks in a RAID storage system, the method comprising:

receiving a request to dynamically resize mirrored virtual disks in a RAID storage system (on-line resizing, in response to user's request, par. 0045; RAID level information representing construction type of the logical volume, par. 040);

manipulating RAIDs in the RAID storage system to be assigned to the mirrored virtual disks (a method for managing a logical volume in order to support dynamic online resizing, par. 0038; by providing flexibility of mapping, the size of volume can be dynamically increasing and decreasing effectively during operating a system and a RAID level of the volume can be applied to a newly added storage space, par. 0042); resizing the mirrored virtual disks (par. 0038, 0042); and

providing the resized mirrored virtual disks for operation (par. 0038, 0042).

For claim 2, Kim further discloses the request to dynamically resize mirrored virtual disks in a RAID storage system is a request to dynamically expand mirrored virtual disks in a RAID storage system, and wherein the manipulating RAIDs comprises:

creating an amount of storage necessary by providing RAIDs on each subsystem that is associated with each component of a mirror set (creating a logical volume by rounding up disk partitions in response to a request of constructing the logical volume on a physical storage space, par. 0038; par. 0042);

assigning the RAIDs to a specific virtual disk for a mirror device (a RAID level of the volume can be applied to a newly added storage space, par. 0042); and

specifying a size for the virtual disk and mapping the size of the virtual disk directly to all components of the mirror set (the size of volume can be dynamically increasing and decreasing effectively during operating a system, par. 0042; the present invention maintains a mapping table separately without using a fixed mapping function, par. 0041; a dynamic mapping method for modifying mapping between a logical address used in high-level module and a physical address of physical disk device according to situations, par. 0047; modifying the metadata on the disk partitions participating to the logical volume and calculating and returning a physical address corresponding to al ogical address of the logical volume by using mapping information of the metadata containing information of the physical address corresponding to the logical address, par. 0039).

For claim 3, Kim further discloses specifying a size for the virtual disk and mapping the size of the virtual disk as performed by an operating system (the logical volume manager is a virtual intermediate level device driver located above variety of physical device drivers, uses services of physical device drivers, and is included in a operating system of a computer, par. 0068).

Claim 6 is rejected under the same rationale as per claim 2, where Kim further discloses a program storage device readable by a computer tangibly embodying one or more programs of instructions executable by the computer to perform the method (computer-readable recording medium storing a program or data structure for embodying the method, par. 0001).

Claim 8 is rejected under the same rationale as per claim 1, where Kim further discloses a storage system interface for providing access to a storage system (an interface between a logical volume manager, physical storage devices, and high-level services, par. 0065; fig. 1), host side interface for communicating with host devices (examiner's note: it was well-known in the art at the time of the invention that a method such as dynamic online resizing of logical volumes may involve hosts and an interface for communication with such), and a processor, coupled to the host side interface and the storage system interface (storage system with processor, par. 0039).

Claim 9 is rejected under the same rationale as per claims 2 and 8.

Claim 11 is rejected under the same rationale as per claim 8.

Claim 12 is rejected under the same rationale as per claims 2 and 11.

Claim 14 is rejected under the same rationale as per claim 8.

Claim 15 under the same rationale as per claims 2 and 14.

Allowable Subject Matter

10.   Claims 4-5, 7, 10, 13 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims, with all appropriate corrections made.

11.   The following is a statement of reasons for the indication of allowable subject matter:

For claims 4-5, 7, 10, 13 and 16, no prior art of record or combination thereof describes "detaching any RAIDs that extend beyond the specified size of the virtual disk" nor "truncating RAIDs to free up any excess physical segments back into the RAID storage system".

Conclusion

12.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

When responding to this Office Action:

13.   Applicant is requested to indicate where in the disclosure support is to be found for any new language added to the claims by amendment. 37 C.F.R. § 1.75(d)(1) requires such support in the Specification for any new language added to the claims and 37 C.F.R. § 1.83(a) requires support be found in the Drawings for all claimed features.

Applicant must clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made, and must also explain how the amendments avoid the references or objections. See 37 C.F.R. § 1.111(c).

Contact Information

14.   Any inquiries concerning this action or earlier actions from the examiner should be directed to Daniel Kim, reachable at 571-272-2742, on Mon-Fri from 10:00am-6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah, is also reachable at 571-272-4098.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information from published applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. All questions

regarding access to the Private PAIR system should be directed to the Electronic

Business Center (EBC), reachable at 866-217-9197.

DK

8-28-07

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